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Have an Omnichannel Seamless Interaction Experience! Dimensions and Effect on Consumer Satisfaction.

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The challenge for omnichannel retailers is to offer a seamless experience across all touchpoints. However, there is a lack of research that provides theoretical and empirical evidence about how firms can create such experiences. The aim of the current research is to analyze: (1) the concept of omnichannel seamless interaction experience (OSIE) and (2) its effect on customer satisfaction with the interaction. Based on a systematic literature review and running a content analysis, consistency, freedom in channel selection, and synchronization across channels were identified as OSIE dimensions. In two studies and using two methods, a survey and a controlled experiment, these OSIE dimensions and downstream effects were tested. The findings confirm the multidimensionality of OSIE –composed of consistency, synchronization, and freedom in channel selection– and its positive effect on customer satisfaction with the interaction.

Keywords: Omnichannel; Seamless; Interaction; Experience; Satisfaction; Consumer

Summary Statement of Contribution:

This research is the first to conceptually propose and empirically test the dimensions of the omnichannel seamless interaction experience (OSIE) put forth in the literature: consistency, freedom in channel selection, and synchronization. Further, this research confirms the effect of

the OSIE on customer satisfaction with the interaction. We build upon research on omnichannel retail management and incrementally extend the literature by synthesizing and empirically testing the propositions put forth thus far.

Introduction

The retailing industry has experienced a substantial change as a result of the evolution of technology over the last three decades. With the introduction of new retail channels, such as online and mobile, consumer behavior has evolved dramatically to incorporate the use of several channels throughout the decision-making process. Consumers interact with companies across multiple retail channels and are seeking seamlessness as they move between touchpoints (Lazaris, Vrechopoulos, Doukidis, & Fraidaki, 2015). This new omnichannel behavior has been recognized by both academics and practitioners as a central issue in retail strategy (Ewerhard, Sisovsky, & Johansson, 2019). Specifically, omnichannel research has emphasized the importance of seamlessness across channels to facilitate more positive consumer-brand interaction experiences (Picot-Coupey, Huré, & Piveteau, 2016; Verhoef, Kannan, & Inman, 2015).

However, despite acknowledgement of its importance, research has not yet delved into how retailers can create a seamless interaction experience, either theoretically or empirically. The seamlessness of the customer experience, such that they can interact with the brand by navigating between channels with continuity and ease, is key in omnichannel management. Though “seamless” interaction has been defined as when “the distinctions between physical and online will vanish, turning the world into a showroom without walls” (Brynjolfsson, Hu, & Rahman, 2013, p. 23), there is uncertainty as to how it can be implemented by firms. However, it has only been superficially described in the literature and many retailers are still struggling to deliver such an experience (Piotrowicz and Cuthbertson, 2014).

As a result, there are still many unanswered questions regarding how firms can create a seamless interaction experience (Mosquera, Pascual, & Juaneda Ayensa, 2017; Verhoef, et al., 2015). The conceptualization of the omnichannel seamless interaction experience (OSIE) and the dimensions that are part of this construct need to be identified. Drawing from insights in the literature (Barwitz and Maas, 2018; Haider, Zhuang, Hashmi, & Ali, 2020; Shen, Li, Sun, & Wang, 2018), this paper refers to the OSIE as the overall result of consumers' accumulated interactions, in which they had the opportunity to freely and effortlessly switch between channels and touchpoints during the different phases of the customer journey, without any information loss or reiteration. Additionally, the downstream effects, such as the impact of the OSIE on customer satisfaction, can be explored further (Ewerhard, et al., 2019; Lemon and Verhoef, 2016). Literature has emphasized its critical role in satisfying customers' needs in the omnichannel environment (Picot-Coupey, et al., 2016; Rigby, 2011; Saghiri, Wilding, Mena, & Bourlakis, 2017; Verhoef, et al., 2015). Therefore, the present study fills this gap in omnichannel literature by (1) proposing and empirically testing the dimensions of the OSIE construct that have been conjectured in the literature and (2) analyzing its effect on customer satisfaction with the omnichannel interaction. More specifically, two research questions are examined:

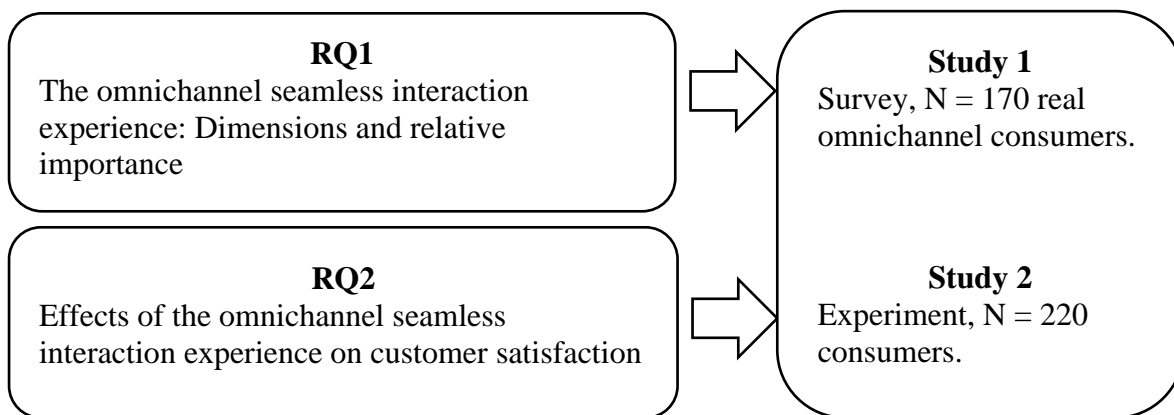
RQ1. *What are the dimensions of the omnichannel seamless interaction experience and how do they differ in importance?*

RQ2. *How does the omnichannel seamless interaction experience influence customer satisfaction with the interaction?*

These research questions are addressed in two studies. See Figure 1 for an overview of the research process. Extant literature in the omnichannel domain was thoroughly examined to identify overarching themes regarding the importance of seamlessness. The present research uses guidance from the literature to outline a clear, multidimensional construct that

defines the distinct dimensions that contribute to the seamlessness of the OSIE. Through a systematic review of the literature, three important dimensions of the OSIE construct were identified: consistency, freedom in channel selection, and synchronization across channels. In study 1, these dimensions were examined using a survey that measured customer perceptions of their real prior omnichannel shopping episodes and tested the effect of the three OSIE dimensions on customer satisfaction. In study 2, the dimensions of the OSIE were manipulated in a controlled experiment to confirm the dimensionality of the OSIE construct and its influence on customer satisfaction. The results are replicated across two studies using two distinct methods to offer stronger support for the proposed multidimensional construct and its resultant impact on customer satisfaction.

Figure 1. Research process overview.



This paper contributes to omnichannel literature twofold. First, this research identifies and empirically measures three distinct dimensions of the OSIE. Second, this research provides an incremental theoretical contribution by testing the importance of the OSIE on customer satisfaction with the omnichannel interaction. Prior literature has explored various aspects of consumer behavior in the omnichannel context, such as channel choice, shopping value, omnichannel services usage, or consumer personality (Huré, Picot-Coupey, & Ackermann, 2017; Park and Lee, 2017; Rodríguez-Torrico, San-Jose Cabezudo, & San-Martín, 2017; Shen, et al., 2018), all of which highlight the importance of providing

seamlessness during omnichannel interactions (e.g. Ieva and Ziliani, 2018; Verhoef, et al., 2015). However, the present research is the first to examine the proposed theoretical dimensions of OSIE through both survey and experimental data. This paper lays a foundation on which future omnichannel research can build, by offering a complete and original framework for the OSIE.

The rest of the paper is organized as follows. First, the literature review is presented and the aims of this paper are captured in two research questions. Both the OSIE construct and its effect on customer satisfaction are explained and a multidimensional framework is laid out. Next, the methodology and analysis of study 1 and study 2 are described. Finally, the results are described and the theoretical and managerial implications of the findings are discussed.

Omnichannel behavior: The new customer experience

As the importance of omnichannel management has grown, it has been examined by an increasing number of researchers. A systematic review of the literature was undertaken to identify the ways in which omnichannel construct has been conceptualized. Table 1 illustrates the various ways in which omnichannel retailing has been defined in the literature.

Table 1. The omnichannel conceptualization.

Author/s	Definitions of omnichannel concept
Rigby (2011, p. 4)	Omnichannel retailing: “an integrated sales experience that melds the advantages of physical stores with the information-rich experience of online shopping.”
Levy, Weitz, & Grewal (2013, p. 67)	Omnichannel retailing: “a coordinated multichannel offering that provides a seamless experience when using all of the retailer’s shopping channels.”
Lazaris and Vrechopoulos (2014, p. 2)	Omnichannel retailing: “the use of both physical and online channels combined with the delivery of seamless shopping experiences.”
Verhoef, et al. (2015, p. 176)	Omnichannel management: “the synergetic management of the numerous available channels and customers touchpoints, in such a way that the customer experience across channels and the performance over channels is optimized.”

Cummins, Peltier, & Dixon (2016, p. 5)	Omnichannel marketing (in a sales context): “the synergetic integration of customer touchpoints and communication opportunities for the purpose of creating a unified brand experience regardless of channel, platform or stage in the selling process.”
Blom, Lange, & Hess Jr (2017, p. 287).	Omnichannel management: “is the way to create an overall retailing experience that is the same across channels and touchpoints.”
Huré, et al. (2017, p. 315)	Omnichannel shopping: “the complete alignment of the different channels and touchpoints, resulting in an optimal-brand customer experience.”
Shen, et al. (2018, pp. 62, 63)	Omnichannel service: “a kind of service that allows customers freely choose among all parallel channels, and seamlessly switch among the different channels, without any information loss or reiteration.”
	“The concept of “omnichannel” evolved from multichannel, with a specific focus on the integration and coordination of detached channels to meet consumers' needs for seamless channel transitions.”

Despite the variety in these conceptualizations, a prevalent aspect of omnichannel retailing emerges; it provides an improved consumer experience by integrating all retail channels (Barwitz and Maas, 2018; Lazaris and Vrechopoulos, 2014). In line with these definitions, prior research has confirmed that omnichannel retailing is characterized by offering a seamless interaction across channels without interruptions (Huré, et al., 2017; Saghiri, et al., 2017; Shen, et al., 2018; Verhoef, et al., 2015). The seamlessness of the transition between retail channels is the key differentiating element in omnichannel retailing. A multichannel strategy in which channels are managed separately is believed to be obsolete and should be replaced with channel management that fully integrates all touchpoints so that consumers can interact with the brand using interchangeable channels (Beck and Rygl, 2015; Cao and Li, 2018; Verhoef, et al., 2015).

The dimensions of the omnichannel seamless interaction experience

In omnichannel retailing, seamlessness means eliminating the distinctions between all of the different available channels, effectively turning the world into a “showroom without walls”

(Brynjolfsson, et al., 2013). This is a challenge for retailers because it requires changes to their existing channel design to ensure that there are no ruptures when navigating from one to another, effectively blurring the barriers between channels (Huré, et al., 2017; Ostrom, Parasuraman, Bowen, Patricio, & Voss, 2015; Verhoef, et al., 2015). Omnichannel literature has clearly theorized the importance of seamlessness, but no research thus far has synthesized what it means to create a seamless interaction experience. As consumers navigate across the growing number of brand touchpoints, including offline brick and mortar stores, online, mobile, and social media (Cao and Li, 2018), the aspects of these channels that make the consumer's interaction seamless have not yet been defined. The present research takes the first steps toward building a framework of this concept.

In multichannel context, Wu and Chang (2016) identified the dimensions of multichannel integration quality based on previous research. They concluded that diversification, consistency, and reciprocity are the three main characteristics of multichannel integration that provide customers an optimal experience across channels. Omnichannel management has evolved from literature on multichannel management and channel integration (Lee and Kim, 2010; Oh and Teo, 2010; Wu and Chang, 2016), so the present research tries to identify how these crucial characteristics are presented in the omnichannel context. To this end, a literature review was carried out. Statements describing what it means to be “seamless” were identified in extant research to analyze the underlying dimensions of the construct. Appendix 1 summarizes the relevant literature and the associated dimension that can be derived from the respective authors' insights on OSIE.

Applying the knowledge of multichannel literature (Lee and Kim, 2010; Oh and Teo, 2010; Wu and Chang, 2016) combined with a thorough literature review of the omnichannel research (Appendix 1), this paper proposes three dimensions of an OSIE: consistency, freedom in channel selection, and synchronization across channels.

The first dimension of OSIE that was highlighted across the literature is consistency. Consistency is defined as the consumers' perceived coherence of retail touchpoints (Picot-Coupey, et al., 2016). Retailers must develop consistency across all the touchpoints (Piotrowicz and Cuthbertson, 2014; Saghiri, et al., 2017; Valos, Maplestone, Polonsky, & Ewing, 2017), because ensuring coherence and uniformity across channels is a central part of the omnichannel strategy (Mosquera, et al., 2017; Shen, et al., 2018) and is expected by the majority of consumers (Huré, et al., 2017; Ieva and Ziliani, 2018; Shankar, Inman, Mantrala, Kelley, & Rizley, 2011). Brand image, products, promotions, prices, and available services are five aspects of the retailing mix for which consistency across channels is fundamental (Beck and Rygl, 2015; Cao and Li, 2015; Huré, et al., 2017; Lazaris and Vrechopoulos, 2014; Neslin et al., 2006). Therefore, firms must ensure that all channels present these particular attributes consistently, as this will contribute to the perceived seamlessness of the omnichannel interaction.

In addition to consistency, freedom in channel selection was also emphasized in the literature, as shown in Appendix 1. It refers to consumers' perception about the level of freedom they have to select different channels for various types of interactions with the brand, such as shopping, returning, delivery, and searching for information (Lee and Kim, 2010). A firm needs to consider consumers' movement across channels throughout the shopping process in order to provide a seamless interaction experience (Huré, et al., 2017; Verhoef, et al., 2015). Specifically, promoting the use of multiple channels is considered an innovative way to provide seamlessness (Shankar, et al., 2011). This involves giving consumers control and allowing them to choose their preferred channel at each step of the purchase process, including information search, purchase, return, delivery, and self-service (Chatterjee, 2010; Ostrom, et al., 2015; Piotrowicz and Cuthbertson, 2014; Shen, et al., 2018). Omni-consumers are characterized by the capability to select to use any of the available channels during any

phase of their decision-making process depending on their needs, and when channels are constructed to give consumers this freedom to do so, it enhances the seamlessness of the consumer interaction experience (Peltola, Vainio, & Nieminen, 2015).

Channel synchronization is the third and final dimension of the OSIE. It captures the idea that consumers use all touchpoints interchangeably for searching, shopping, ordering, purchasing, pickup, delivery, and returns (Sands, Ferraro, Campbell, & Pallant, 2016) and there is no rupture when moving from one touchpoint to another one (Huré, et al., 2017; Lazaris and Vrechopoulos, 2014). This dimension goes hand-in-hand with freedom in channel selection. Not only is the ability to choose between channels at different points in the decision process important (Chatterjee, 2010; Juaneda-Ayensa, Mosquera, & Sierra Murillo, 2016; Piotrowicz and Cuthbertson, 2014; Saghiri, et al., 2017), but, moreover, synchronization between the channels such that consumers may interchangeably use any channel for any part of the decision process is necessary (Kim, Ahn, & Forney, 2014; Shen, et al., 2018; Verhoef, et al., 2015; J. Zhang et al., 2010). Channels may be connected in a way that consumers can complete their shopping process whenever they want (Huang, Lu, & Ba, 2016; Ieva and Ziliani, 2018). Similarly, Picot-Coupey, et al. (2016) found that in the omnichannel environment, it is challenging for firms to ensure the synchronization across touchpoints, but important to do so in order to provide a better experience.

In the present research, these three underlying dimensions are examined, as well as the relative importance of each of the proposed dimensions. Formally,

RQ1. What are the dimensions of the omnichannel seamless interaction experience and how do they differ in importance?

The effects of the omnichannel seamless interaction experience

Providing seamless omnichannel interactions has become a “de facto standard” (Shankar, et al., 2011) that has a positive impact on both the customer and the firm. When managing multiple channels, it is crucial to allow consumers to choose when, where, and how they will interact with the retailer, because it is associated with positive outcomes such as higher customer satisfaction (Kumar and Reinartz, 2016; Leroi-Werelds, Streukens, Brady, & Swinnen, 2014). This positively impacts the firm through increased customer purchases, loyalty, and retention (Chatterjee, 2010; Lazaris and Vrechopoulos, 2014; Mosquera, Olarte-Pascual, Juaneda Ayensa, & Sierra Murillo, 2018; Shankar et al., 2016). Moreover, when omnichannel retailers provide seamless channel transitions, relative to a non-seamless transitions, customers are more likely to engage with the brand across multiple touchpoints (Shen, et al., 2018). Such firms are highly valued by customers (Neslin and Shankar, 2009). A lack of seamlessness may degrade the positive impact that omnichannel shopping has on sales and customer satisfaction (Huré, et al., 2017).

Omnichannel literature has established the importance of developing seamlessly integrated channels, suggesting that it is the key to superior customer interaction experiences (Brynjolfsson, et al., 2013; Ieva and Ziliani, 2018; Rapp, Baker, Bachrach, Ogilvie, & Beitelspacher, 2015). It also has stated that, if customers perceive their omnichannel interactions to be seamless, it would lead to important positive downstream effects such as increased satisfaction (Frasquet and Miquel, 2017; Piotrowicz and Cuthbertson, 2014; Shankar, et al., 2011). However, there is not yet empirical evidence supporting the positive impact of OSIE on customer satisfaction with the omnichannel interaction. This is proposed in research question 2.

RQ2. How does the omnichannel seamless interaction experience influence customer satisfaction?

Model conceptualization

The previous literature review has provided support for the proposed multidimensional construct of the OSIE. However, in order to confirm that the interpretation of the literature review is correctly represented in the dimensions proposed and that no other dimensions are missing from our conceptualization of the OSIE, a content analysis was run using ATLAS.ti software.

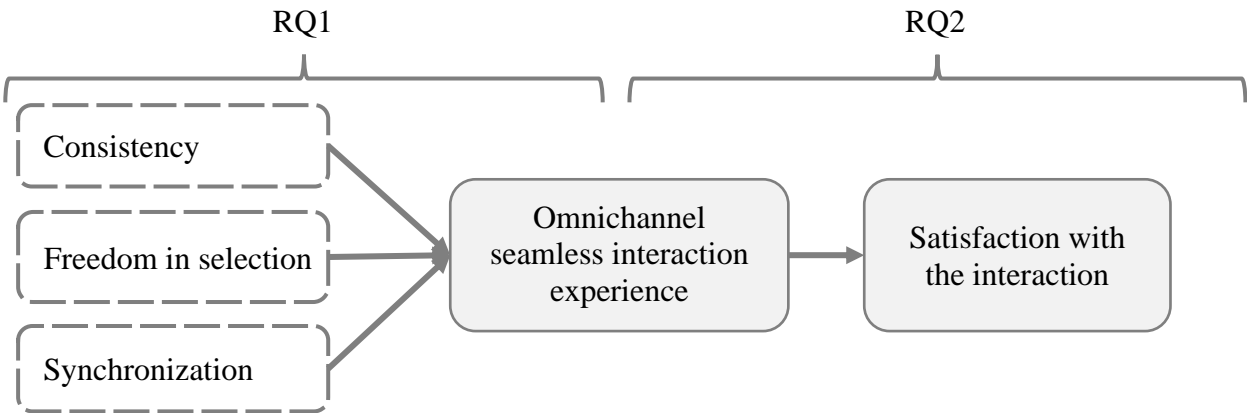
Specifically, to carry out the content analysis we defined the sample, the unit of analysis, the categories of the analysis, and the coding system following the process outlined by Kassirjian (1977). In this case, the sample is composed of published research articles obtained from the omnichannel literature that elaborate on what it means to be seamless (see Appendix 1). The unit of analysis, or the elements on which the content analysis focuses, are the text extracts where these scientific works explicate the different aspects related to seamlessness. The categories of analysis are the three OSIE dimensions identified: consistency, freedom in channel selection, and synchronization. Finally, the coding system consisted of registering the presence (or not) of each of the dimensions. One researcher carried out the registration process, which was then reviewed by two researchers. To guarantee the reliability of the process, the researchers who carried out the analysis are experts in the subject to be investigated and know, in depth, the meaning of the aspects to be analyzed. Furthermore, the content coding process was discussed and agreed upon to make the classification criteria clear, to eliminate any possible source of subjective interpretation.

Additionally, the unit of analysis (i.e. the text extracts from the literature that represents OSIE) was compared to the explanation of the dimensions provided by the authors in this work (*The dimensions of the omnichannel seamless interaction experience* section). Two researchers analyzed the content to confirm the presence of the three proposed dimensions and to verify that no other dimensions of OSIE were present. The researchers were in

agreement and thus, the content analysis confirms that the dimensions proposed concur with the OSIE description in the literature.

Therefore, the three dimensions that are believed to contribute to consumer perceptions of seamlessness in an omnichannel interaction are consistency, freedom in channel selection, and synchronization. The two research questions examined in this research are illustrated in the proposed model below (see Figure 2).

Figure 2. Proposed model



Study 1

To examine the research questions posed in this paper, first a descriptive study in which participants evaluate a past real omnichannel shopping episode was conducted. Using data from real omnichannel interactions, the proposed dimensions of the OSIE and their impact on customer satisfaction was measured. This study provides a foundational step to establish the multidimensionality of OSIE.

Methodology and Procedure

In study 1, data was collected using an online questionnaire on Amazon Mechanical Turk (MTurk). MTurk respondents received \$.50 upon completion of the survey. As the study focuses on omnichannel behavior, participation was restricted to respondents that had previously behaved as omni-consumers. The potential respondents were first asked a filter

question regarding their prior omnichannel behavior (*Have you ever interacted with a company through more than one channel either prior to, during, or after a purchase occasion?*), and only those that answered “yes” were able to proceed. To ensure that respondents effectively understood this, descriptions of “channels” and examples of interactions using more than one channel prior, during, or after a purchase occasion were included.

After the filter question, the respondents were asked to think about their last omnichannel interaction with a brand. Then they were asked to answer questions about that interaction experience regarding the perceived seamlessness, their satisfaction with the interaction, and, finally, they reported their demographics. A total of 244 surveys were gathered. After removing the non-qualifying respondents (non-omnichannel consumers) and incomplete responses, 170 respondents remained and were used in the analysis. The average age of the sample was 35 years old. Among the respondents, 55.9% were male, 40.6% were female and 3.5% N/A. More than 95% had an annual income below \$100,000.

This study used Partial Least Squares Structural Equation Modelling (PLS-SEM) and SPSS to analyze the data. PLS-SEM is a multivariate analysis approach that estimates principal component analysis to assess the measurement models (Hair, Sarstedt, Ringle, & Gudergan, 2018). It is robust for small samples and allows estimation of both types of measurement scales, reflective and formative (Chin and Newsted, 1999). Specifically, in order to measure the model, which is composed of formative scales, the statistical software SmartPLS Version 3.2.6 was used, and to test the second research question the SPSS Statistics 24 was selected.

Measurement development

The variables were measured using 5-point Likert scales, ranging from strongly disagree (1) to strongly agree (5). The questionnaire was comprised of questions about the respondent's last omnichannel shopping episode. OSIE was implemented as a second-order construct because it has been conceptualized as a multidimensional entity. Conceptually, a construct is multidimensional "when it consists of a number of interrelated attributes or dimensions and exists in multidimensional domains. In contrast to a set of interrelated unidimensional constructs, the dimensions of a multidimensional construct can be conceptualized under an overall abstraction, and it is theoretically meaningful and parsimonious to use this overall abstraction as a representation of the dimensions" (Law, Wong, & Mobley, 1998, p. 741).

As no specific measure existed in extant research, a metric for the variable OSIE was developed by examining the literature for scales that capture the dimensions of a seamless interaction experience outlined above. Although some authors have advanced on channel integration measures (Lee and Kim, 2010; Oh and Teo, 2010), their scope is reduced to multi- and cross-channel management. As omnichannel retailing embraces the typical multichannel management strategies but also includes the seamless transition between channels (Ewerhard, et al., 2019), it is necessary to adapt and extend the measures to this context of study.

In multi-channel management, the goal is to simply offer more than one channel for customers, but channels are isolated and there is no integration. In cross-channel management, the objective is for customers to be able to move between channels; channels are interdependent and there is only partial integration. Thus, in these cases, some consistency, freedom to select some channels, and synchronization are expected, but these aspects are not all required. However, in omnichannel management, channels are viewed as unified, and full integration is required to provide a seamless experience (Beck and Rygl, 2015; Mirsch, Lehrer, & Jung, 2016; Picot-Coupey, et al., 2016; Verhoef, et al., 2015).

Therefore, only a partial consistency, freedom to select some channels, or synchronization is not enough. Complete consistency, freedom to select all channels throughout the shopping process, and synchronization are required in a broad way.

As a result, the scales from multi- and cross-management have been adapted to consider these new requirements of the omnichannel context by emphasizing “all the channels,” instead of some of them, as it was presented in the original scales (e.g. The brand provided consistent store images between all the channels.”). Moreover, as touchpoints are integrated to allow seamlessness without ruptures (Picot-Coupey, et al., 2016), all the aspects that were optional in the multi- and cross-channel cases are necessary and irreplaceable in the omnichannel context. Therefore, OSIE is treated as a formative first-order and formative second-order construct because in formative scales, inclusiveness is key. Consequently, all the items measured in the scales are considered crucial for creating seamlessness. The elimination of any of them would imply a multi- or cross-channel interaction experience, rather than omnichannel.

Moreover, to confirm that we specify the model correctly, the decision rules proposed by Jarvis, MacKenzie, & Podsakoff (2003) have been followed. Specifically, as the authors stated, “four sets of questions should be used in combination to determine the appropriate measurement model” (p. 203).

- (1) The direction of causality is examined. In this case, indicators are defining characteristics of the construct and determine it.
- (2) The interchangeability of the indicators is considered. In this concrete case, both at the first and second level, the indicators are not interchangeable because they do not share a common theme, and if an indicator is removed, it could alter the concept of the construct. Specifically, the conceptual nature of the OSIE implies that any

change in one of the components can cause a change in the construct, which is a key theoretical consideration for assessing the constructs (Coltman, Devinney, Midgley, & Venaik, 2008). For instance, if one of the items or dimensions is removed, the variable that is measured radically changes because the expected seamlessness disappears, and a multi- or cross-channel experience would be measured, rather than an OSIE.

(3) The covariation among the indicators is assessed. In the case of reflective constructs, the indicators must covary with each other. Conversely, the indicators of a formative construct might not necessarily covary. In this case, the indicators and dimensions of OSIE do not present high correlation values, which indicates their formative character (see Appendix 3).

(4) Antecedents and consequences of the indicators are examined. Jarvis, et al. (2003) propose to analyze the nomological net of the construct indicators, that is, whether all of the indicators are required to have the same antecedents and consequences or not. In the case of OSIE, this rule allows us to determine that the construct and dimensions are formative because they are not required to have the same antecedents and consequences.

Consequently, from the conceptualizations that emerged from the omnichannel literature (Huré, et al., 2017; Lazaris and Vrechopoulos, 2014; Verhoef, et al., 2015) and using the scales previously validated in the literature to measure those dimensions, a scale was constructed to capture three dimensions: consistency, freedom in channel selection, and synchronization.

Regarding consistency, the five items developed by Lee and Kim (2010) and Wu and Chang (2016) were adapted to the formative scale. These measures relate to the main aspects

of the retailing mix for which perceived consistency is mentioned in the literature and required in omnichannel management (Beck and Rygl, 2015; Cao and Li, 2015; Huré, et al., 2017; Lazaris and Vrechopoulos, 2014; Neslin, et al., 2006): image, product, promotions, price, and services. Similarly, four items adapted from Lee and Kim (2010) were used to measure freedom in channel selection for all the stages of decision-making. To measure channel synchronization, six items were adapted from Oh and Teo (2010) to capture the ability to switch between all channels at the different stages (search for information, purchase, pick up, return, and post-purchase service) (Kim, et al., 2014). Finally, satisfaction with the omnichannel interaction was measured using three items adapted from Walsh, Shiu, & Hassan (2014) (“*Overall, I am satisfied with this last interaction with the brand,*” “*I am pleased with this last interaction with the brand,*” and “*I am delighted with this last interaction with the brand*”).

Results of the Measurement Model

This research takes the two-stage approach to approximate the second-order construct. In this case, the three dimensions of the OSIE, consistency, freedom in channel selection, and synchronization, have an unequal number of indicators: five, four and six, respectively. Consequently, the two-stage approach solves the problem of unequal number of indicators at the first-order level and it has the advantage of estimating a more parsimonious model on the second-level analysis without needing the first-order constructs (Becker, Klein, & Wetzels, 2012; Hair, et al., 2018; Ringle, Sarstedt, & Straub, 2012). Considering that the election of an approach should be based on each research particularities (Becker, et al., 2012), the assessment of this measurement model was undertaken at two levels.

First, at the first-order level, the multicollinearity of the dimensions was assessed (Hair, Ringle, & Sarstedt, 2011) (Table 2): variance inflation factor (VIF) values are below 5; and the tolerance values (IT) are above .10, as literature recommends (Hair, Hult, Ringle, &

Sarstedt, 2017). In order to analyze construct validity, item weights were examined. As some indicator weights are not significant, loadings significance was observed. Item loadings presented significant values in all the cases, therefore, the indicators in the formative constructs were retained (Hair, et al. (2017).

Table 2. First-order measurement model.

Variable	Formative dimension	Items	Weights (t-Value)	Loadings (t-Value)
OSIE	Consistency <i>“The brand provided consistent...”</i>	...store images between the all channels. (VIF=1.225, IT=.811)	.396 (2.957)	.704 (7.179)
		...product information between the all channels. (VIF=1.562, IT=.639)	.258 (2.124)	.741 (9.864)
		...promotional information between the all channels. (VIF=1.569, IT=.644)	.373 (2.899)	.787 (10.960)
		...pricing policy between the all channels. (VIF=1.381, IT=.726)	.067 (.690)	.554 (6.047)
		...customer services between the all channels. (VIF=1.458, IT=.678)	.288 (2.483)	.691 (7.612)
	Freedom in channel selection <i>“The brand allowed me...”</i>	...to choose where to shop for merchandise. (VIF=1.198, IT=.835)	.586 (5.042)	.815 (10.828)
		...to choose a way of returning the merchandise. (VIF=1.364, IT=.733)	.322 (2.433)	.704 (7.493)
		...to arrange delivery options. (VIF=1.432, IT=.698)	.262 (1.693)	.617 (5.439)
		...to arrange various service options. (VIF=1.378, IT=.726)	.212 (1.445)	.634 (6.295)
	Synchronization <i>“The brand allowed me...”</i>	...to examine products physically once I find them in another online/mobile channel. (VIF=1.322, IT=.756)	.111 (1.025)	.451 (4.327)
		...to search for product information in one channel and then purchase it in another channel. (VIF=1.344, IT=.744)	.065 (.539)	.469 (4.227)
		...to pick up products bought in one channel through another channel. (VIF=1.466, IT=.682)	.218 (1.264)	.540 (5.006)
		...to return products bought in one channel through another channel. (VIF=1.390, IT=.719)	-.016 (.141)	.370 (3.490)
		...to request post-purchase services for any product bought in one channel through another channel. (VIF=1.364, IT=.733)	-.035 (.305)	.411 (3.732)

...to choose the most convenient way of interacting with this vendor (e.g., search, purchase, pick up, return, post-purchase...) through all the channels. (VIF=1.318, IT=.759)	.853 (8.953)	.964 (22.809)
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Thus, in order to respond to RQ1, following the literature guidelines (Becker, et al., 2012; Hair, et al., 2018; Ringle, et al., 2012), the previously validated first-order construct can then be incorporated into the second-order measurement model as presented in Table 3. Similarly to the first stage, multicollinearity was ruled out in the second level. As can be seen, VIF values are below 5 and IT values are above .10. In addition, construct validity was assessed. As can be seen, all weight coefficients show significant values at a confidence level of 95% ($t > 1.96$) except for freedom in channel selection. Although this dimension does not show a confidence level of 95%, the construct validity can be confirmed due to the fact that its loading value is significant, as Hair, et al. (2017) recommend. These findings address RQ1 and illustrate three distinct dimensions of the OSIE construct and their relative importance, as indicated by their weights (Table 3).

Table 3. Second-order measurement model.

Variable	Formative dimension	Weights (<i>t</i> -Value)	Loadings (<i>t</i> -Value)	VIF	IT
OSIE	Consistency	.550 (5.069)	.873 (18.325)	1.477	.677
	Freedom in channel selection	.175 (1.361)	.754 (10.252)	1.851	.540
	Synchronization	.457 (4.541)	8.47 (17.027)	1.809	.553

With regards to satisfaction, the reflective latent variable, the reliability and validity of the scale was confirmed. The confirmatory factor analysis (CFA) of the three satisfaction measures yielded a Cronbach's alpha above .7 ($\alpha = .821$), composite reliability above .6 (CR

= .894), and average variance extracted above .5 (AVE = .738), as recommended (Hair, et al., 2017).

Linear regression model analysis

After validating the measurement model, the proposed RQ2 was tested by estimating a multiple linear regression model. To accomplish this, the latent variables scores obtained from PLS algorithm results were used in SPSS. Gender, age and annual income were included in the model as covariates to control for the demographics. Table 4 shows the model without covariates (Model 1) and with covariates (Model 2). In both cases, the model is significant: Model 1: $F(1, 168) = 206.695, p < .001$ with a Rsquared of .522 and Model 2: $F(4, 158) = 52.172, p < .001$ with a Rsquared of .569. Therefore, the proposed model considering the control of the covariates accounts for 56.9% of variance in our data. As can be observed in Table 4, the results show the significant positive influence of OSIE on satisfaction with the omnichannel interaction, supporting the proposed research question, RQ2. As perceived seamlessness of the interaction experience increased, participants indicated higher levels of satisfaction with the omnichannel interaction. In addition, gender presents a marginal impact ($p < .10$) on customer satisfaction with the omnichannel interaction, such that females present higher levels of satisfaction with the omnichannel interaction than males.

Table 4. Multiple linear regression analysis results for satisfaction.

	Model 1		Model 2		VIF
	β standardized	<i>t</i> -Value	β standardized	<i>t</i> -Value	
Omnichannel seamless interaction experience	.743	14.377***	.731	13.254***	1.088
Gender	-	-	.098	1.852 [†]	1.026
Age	-	-	.062	1.153 ^{n.s.}	1.044
Income	-	-	-.025	-.463 ^{n.s.}	1.029
R ²	.522		.569		
F-statistic	206.695***		52.172***		

*** $p < .001$; ** $p < .01$; * $p < .05$; [†] $p < .10$; n.s., not significant.

Discussion

Study 1 explores the OSIE dimensionality and its effect on customer satisfaction with the omnichannel interaction with data based on real omnichannel interaction experiences. Using a sample of consumers with prior omnichannel experience, the three hypothesized dimensions of the construct, as well as customer satisfaction with the interaction, were measured through an online survey. First, in order to address RQ1, the results of this study offer evidence about the multidimensionality of the OSIE construct composed of the three dimensions.

Consistency, freedom in channel selection, and synchronization have been found in the literature and confirmed in the content analysis as OSIE dimensions. Specifically, the results of Study 1 further support the multidimensionality and show that consistency is the most important dimension, followed by synchronization, and freedom in channel selection. This result expands the findings of Huré, et al. (2017), who concluded that consistency is a prerequisite of seamlessness, but not enough on its own to consider the interaction experience as such. This research goes another step forward by including synchronization and freedom in channel selection as other requisites of an OSIE.

Second, the direct positive effect of the OSIE on customer satisfaction with the interaction was confirmed, addressing the proposed second research question. Therefore, as consumers' perceptions of seamlessness increase, their satisfaction with the omnichannel interaction is significantly increased. In addition, after including the demographics, a marginal effect of gender on customer satisfaction with the omnichannel interaction was revealed, showing that females have higher levels of satisfaction overall than males with the omnichannel interaction.

Limitations

There are some aspects of the study that may limit the generalizability of the findings. Participants were asked to recall their most recent purchase in which they interacted with a

brand on two or more channels. Although this allows for the measurement of consumer perceptions in real brand interactions, the results of our survey rely on participants' recall of their behavior during the purchase scenario and the content that was provided by the brand across channels. Additionally, there could be variation in the number of channels that were used between subjects, as well as the purpose for which each channel was used. Thus it is difficult to assess whether this may impact customer perceptions of the dimensions of OSIE or their resultant satisfaction with the interaction.

Study 2

In this study, the results of study 1 are replicated using a controlled experimental design (see Appendix 2). The proposed dimensions of OSIE and its influence on customer satisfaction with the omnichannel interaction is tested using a hypothetical shopping scenario. This study also addresses some of the limitations of study 1. A hypothetical scenario allows for control over both the type and number of channels with which the participant interacts and the brand-related content that participants will be exposed to during the omnichannel interaction. Additionally, the participants will respond to the survey measures immediately, so the touchpoints will be fresh in their mind. Lastly, this experimental design allows the proposed dimensions of consistency, freedom in channel selection, and synchronization to be manipulated, while holding the rest of the stimuli constant between conditions, to isolate the impact of these specific variables on perceived seamlessness and, subsequently, on satisfaction.

Methodology and Procedure

A new sample of MTurk workers (N = 220) were recruited to participate in a 2 cell (omnichannel interaction experience: seamless vs. non-seamless) between-subjects experiment. MTurk respondents received \$1.25 upon completion of the survey. Participants

were 55% male and a mean age of 38.2 years. 94.5% had an annual income below \$100,000. To ensure the quality of the respondents, MTurk Master Workers with a past survey approval rating of at least 95% were selected (Sheehan, 2018).

The scenarios were pretested ($N = 29$, $M_{\text{age}} = 36.8$, 69% male) using the 5-point Likert scales in study 1. The scenarios were perceived to be seamless and non-seamless, respectively. The scenarios measured significantly different across the dimensions of consistency ($M_{\text{seamless}} = 4.2$, $M_{\text{nonseamless}} = 2.3$, $F(1, 27) = 30.762$, $p < .001$), freedom in channel selection ($M_{\text{seamless}} = 4.3$, $M_{\text{nonseamless}} = 2.6$, $F(1, 27) = 20.190$, $p < .001$), and synchronization ($M_{\text{seamless}} = 4.2$, $M_{\text{nonseamless}} = 2.1$, $F(1, 27) = 50.417$, $p < .001$).

As clothing has been one of the industries that has successfully implemented omnichannel management (Gao and Yang, 2016), this product category was selected for use in this study. Participants were shown stimuli depicting consumer touchpoints for a faux fashion brand, XBRAND, including a mock website, social media page, and imagined in-store shopping scenario. Two versions of the shopping scenario and visual stimuli were created to represent a seamless and a non-seamless interaction by varying the consistency, freedom in channel selection, and synchronization between channels. These dimensions were confirmed in study 1 to be components of the OSIE. Participants were randomly assigned to either the seamless or non-seamless condition and presented with a corresponding omnichannel shopping scenario.

All participants were asked to imagine that they were shopping for a black t-shirt, because it is a standard, unisex product. They were guided through a hypothetical omnichannel interaction, in which they were to pretend that they were in a store speaking to a sales associate, examining the XBRAND website, and social media page (see Appendix 2) for information about the t-shirt.

In the seamless condition, the product information, price, availability, brand logo, and sales promotions for the t-shirt were consistent across channels, as they are the aspects of the retailing mix for which consistency across channels is fundamental (Beck and Rygl, 2015; Cao and Li, 2015; Huré, et al., 2017; Lazaris and Vrechopoulos, 2014; Neslin, et al., 2006). In the non-seamless condition, t-shirt information, price, availability, brand logo, and sales promotions were inconsistent across channels. Moreover, in the seamless condition the participants could freely choose their desired channel to purchase (e.g. “Available in stores and online”). On the contrary, in the non-seamless condition, the election of the channel was restricted (e.g. “Only available on our website”). Finally, synchronization was provided in the seamless condition, where the respondents could see the connections among channels (e.g. a button that offered the option for “in store pickup”). This was not an option in the non-seamless condition.

After reading the shopping scenario and viewing the mock website and social media post for XBRAND, participants responded to a series of questions about their perceptions of the brand and interaction experience and, finally, reported their demographics. The same scales as were used in study 1 were included to measure the perceived consistency, freedom in channel selection, synchronization across channels, and satisfaction with the omnichannel interaction.

Results

Manipulation checks. To ensure that the XBRAND interaction differed in seamlessness between conditions, participants responded to scales assessing each of the three dimensions of an OSIE: consistency, freedom in channel selection, and synchronization.

Consistency. The 5-point Likert scale used in study 1 was used to measure consistency. Participants were asked to indicate how consistent XBRAND was in brand image, product,

promotions, price, and services between channels on a 5-point scale from strongly disagree (1) to strongly agree (5). For ease of analysis, the measures were averaged into an index ($\alpha = .927$). An ANOVA was conducted to examine whether this measure differed significantly between conditions. Results suggest a significant difference in perceived consistency between conditions such that the seamless condition was perceived to be more consistent than the non-seamless condition ($M_{seamless} = 4.24, M_{nonseamless} = 2.30, F(1, 218) = 217.695, p < .001$).

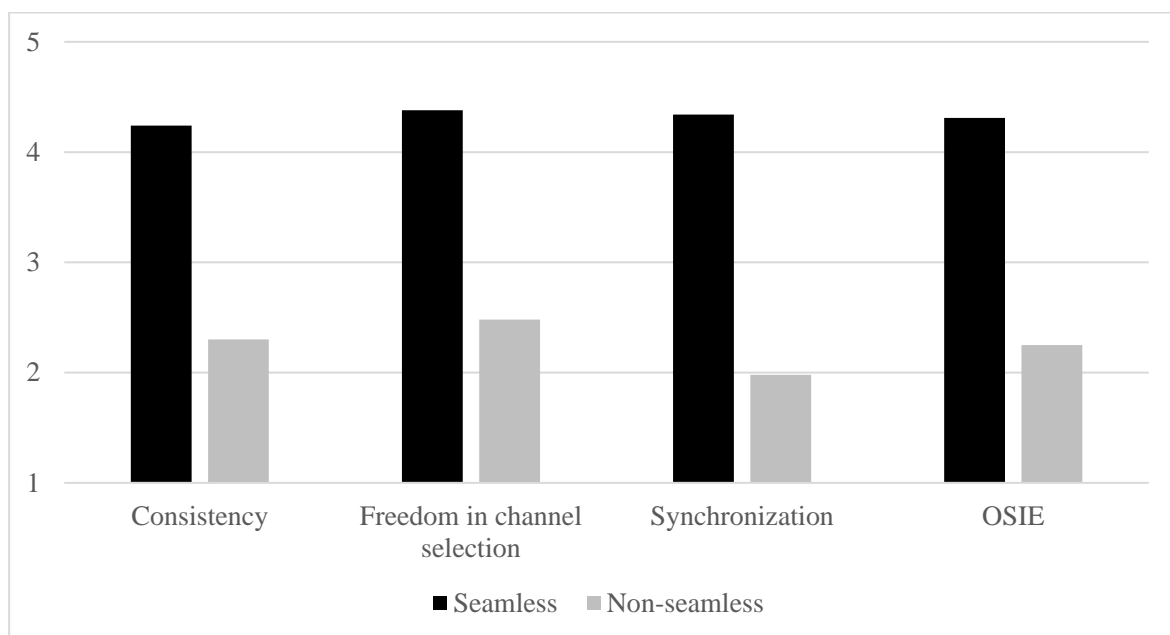
Freedom in channel selection. Freedom in channel selection was measured using the four items used in study 1 on a 5-point Likert scale from strongly disagree (1) to strongly agree (5). For ease of analysis the responses were averaged into an index ($\alpha = .916$). An ANOVA was conducted and revealed that participants in the seamless condition perceived greater freedom in channel selection than those in the non-seamless condition ($M_{seamless} = 4.38, M_{nonseamless} = 2.48, F(1, 218) = 205.333, p < .001$).

Synchronization. Similarly, to measure synchronization across channels, participants responded to six items as in study 1. The questions assessed the ease of navigating between channels to search for information, purchase, pick up, return, and post-purchase on a 5-point scale from strongly disagree (1) to strongly agree (5). The measures were averaged to create an index ($\alpha = .955$). An ANOVA was performed and suggests that participants in the seamless condition perceived greater synchronization across channels than those in the non-seamless condition ($M_{seamless} = 4.34, M_{nonseamless} = 1.98, F(1, 218) = 384.338, p < .001$).

OSIE. The seamless stimuli were perceived to be more consistent across channels, offering greater freedom in channel selection, and providing greater channel synchronization than the non-seamless stimuli. An ANOVA with an index of the three dimensions ($\alpha = .949$) was performed and confirms that in the seamless condition the participants perceived greater OSIE than those in the non-seamless condition ($M_{seamless} = 4.31, M_{nonseamless} = 2.25, F(1, 218) = 320.674, p < .001$). A multivariate analysis of variance (MANOVA) was run to assess the

three dimensions simultaneously. The MANOVA results were significant (Pillai's Trace = 0.641, Wilks's Lambda = 0.359, Hotelling's Trace = 1.789, $F = 128.788$, $p < 0.001$). This suggests that the experimental manipulation was successful as the conditions differ significantly in seamlessness of the omnichannel interaction experience, separately and jointly. Results are summarized in Figure 3.

Figure 3. Study 2: Means of the OSIE dimensions between seamless and non-seamless conditions



Satisfaction. Participants were asked to indicate their level of satisfaction with their omnichannel interaction with the brand. Satisfaction was measured using three items adapted from Walsh, et al. (2014) scale that assessed how satisfied, pleased, and delighted participants were with their interaction with the brand. Responses were measured on a 5-point Likert scale from strongly disagree (1) to strongly agree (5). The measures were averaged to form an index ($\alpha = .965$). To test the impact of the OSIE on this satisfaction index, an ANOVA was performed. Results of the ANOVA indicate that participants in the seamless condition reported greater satisfaction with their interaction experience than those in the non-seamless condition ($M_{seamless} = 4.06$, $M_{nonseamless} = 2.12$, $F(1, 218) = 158.794$, $p < .001$).

Covariates. A second ANOVA was run to test the impact of the OSIE on the satisfaction index with the addition of covariates including age, income, prior omnichannel behavior, and gender. Results suggest no meaningful impact of customer age, income, and prior omnichannel behavior (all p 's $> .05$). However, participant gender was a significant covariate ($F(1, 213) = 3.965, p < .05$).

To examine this further, a contrast analysis was performed. Results suggest that both males and females reported significantly different levels of satisfaction between the seamless and non-seamless conditions. Both males ($M_{seamless} = 4.21, M_{nonseamless} = 2.33, p < .001$) and females ($M_{seamless} = 3.89, M_{nonseamless} = 1.84, p < .001$) reported higher satisfaction in the seamless condition. Within the non-seamless condition, there was a difference between men and women's reported satisfaction. Women rated their satisfaction with the non-seamless interaction experience as significantly more negative than men ($M_{male} = 2.33, M_{female} = 1.84, p < .05$). Within the seamless condition, there was no difference between men and women's satisfaction ratings ($p > .05$).

To examine the relative importance of consistency, freedom in channel selection, and synchronization in the OSIE and its impact on satisfaction, mediation analysis was employed using the PROCESS Macro (Hayes, 2013) in SPSS. Model 4 was selected, as it allows for the test of multiple parallel mediators. Omnichannel interaction experience condition (non-seamless coded as 1, seamless coded as 2) was used as the independent variable, satisfaction with the interaction was used as the dependent variable, and the indices calculated to assess perceived consistency, freedom in channel selection, and synchronization were all entered as mediating variables. Results indicate that there is a significant indirect effect of OSIE through each of the three dimensions, as represented by three 95% bias-corrected confidence intervals using 10,000 bootstrap resamples that do not contain zero (consistency CI = .3486, 1.1758; freedom in channel selection CI = .1349, 1.0056; synchronization CI = .0217, 1.3869). The

effect of each dimension is positive, which suggests that as the omnichannel interaction moves from non-seamless to seamless, higher perceived consistency (Effect = .7482), freedom in channel selection (Effect = .5487), and synchronization (Effect = .6897) each positively impact satisfaction of the interaction experience. As indicated by the effect sizes, these results also support the findings of study 1 regarding the relative importance of each of the three dimensions. Consistency has the largest effect size and therefore the greatest impact on satisfaction, followed by synchronization, and finally by freedom in channel selection.

Discussion

Study 2 examines the proposed dimensions of OSIE and its influence on customer satisfaction with the interaction. Using a controlled experimental design, the seamlessness of an omnichannel interaction experience was manipulated by varying the consistency, freedom in channel selection, and synchronization across channels to examine the impact of seamlessness on customer satisfaction with the omnichannel interaction. The results of this study suggest that greater seamlessness between channels will positively impact customer satisfaction with their interaction experience.

Study 2 results also support the study 1 findings regarding the relative importance of the three dimensions of the OSIE. While all dimensions had a positive and significant effect on satisfaction, consistency had the greatest effect size on reported satisfaction with the omnichannel interaction, followed by synchronization, and finally, by freedom in channel selection. Furthermore, the negative impact of inconsistency across channels on customer satisfaction was especially pronounced for female participants. Both males and females had lower satisfaction in the non-seamless condition compared to the seamless condition, but women's satisfaction ratings were also significantly lower than men's within the non-seamless condition.

Limitations

The limitations of this study are a result of the controlled experimental design. In a hypothetical omnichannel interaction, there is no real purchase being made so participants may not treat the scenario as they would a real shopping situation. Additionally, the omnichannel interactions were restricted to the channels that were presented in the stimuli. Therefore, the interaction didn't allow participants to exercise full freedom in channel selection. However, the perceived freedom to choose the channel of choice for purchase, exchange, return, and information collection was apparent in the scenario through which participants were guided. The hypothetical scenario also reduces the ability to account for diversity amongst participants' preferred use of channels for different parts of the decision process. Research suggests that each day, consumers tend to look for information in their digital devices, such as mobile phones and social media, while they are in the store (Sands, et al., 2016; Shankar, et al., 2016), but they were not able to freely choose which channels to use in the experiment.

General discussion

Omnichannel behavior has become a research priority for the 2018-2020 period (MSI, 2018). Since the emergence of e-commerce, consumers have been including additional electronic and mobile touchpoints during the decision-making process and modifying their uses as technology constantly evolves (Rodríguez-Torraco, et al., 2017). As a result, consumers demand a superior experience in which they can seamlessly transition between touchpoints during the decision-making process. In this vein, despite the fact that offering a seamless interaction experience was strongly stated as critical (Saghiri, et al., 2017; Shen, et al., 2018), research was lacking regarding the specific way for firms to achieve such seamlessness. In addition, empirical evidence is needed to confirm the effect of a seamless interaction on consumers' satisfaction, which, to the extent of our knowledge, was only suggested in the

literature (Picot-Coupey, et al., 2016; Verhoef, et al., 2015). To fill this gap, we proposed to delve into the OSIE, conceptually and empirically. Particularly, we proposed two research questions, the first aimed to know what the dimensions of the OSIE are and the second wanted to confirm if the OSIE influenced consumer satisfaction. Two studies using both information from real omni-consumers and a controlled omnichannel scenario, and two different methodologies (survey and experiment) robustly support the proposed OSIE framework.

As the concept of omnichannel has considered the evolution from multichannel, with a specific focus on channel integration to meet consumers' needs for seamless channel transitions (Shen, et al., 2018), we focused on the seamlessness during the interaction experience. Specifically, to capture OSIE a detailed literature review was carried out, focusing on the main aspects that previous research has associated with seamless in the omnichannel context. Based on a content analysis of this literature, we detected three underlying dimensions of the OSIE, namely consistency, freedom in channel selection and synchronization.

Then, we develop two instruments to measure the importance of these dimensions and the effect of OSIE on consumer satisfaction. In the first study we developed a survey to provide a foundational step to clarify the multidimensionality of OSIE and its effect on consumer satisfaction. In the second study we confirmed both aspects using an experimental design.

This research provides a contribution to omnichannel literature as the first to empirically test the propositions put forth in extant research regarding the ways in which firms can create a seamless interaction experience. According to extant research, the omnichannel interaction must be seamless across channels, without interruptions, to allow the customer to move effortlessly between the different touchpoints (Brynjolfsson, et al., 2013;

Huré, et al., 2017; Rigby, 2011; Verhoef, et al., 2015). The literature has consistently suggested that this seamless interaction experience is the foundation of omnichannel management, however the present research is the first to empirically confirm this statement.

First, the results of two studies confirm the multidimensionality of this construct and the veracity of these three specific dimensions of an OSIE, in response to the first RQ proposed. In addition, this research provides guidance as to the relative importance of these three dimensions. The findings suggest that consistency is the most important dimension for firms to employ to create seamlessness across channels, followed by the synchronization, and finally, freedom in channel selection.

Second, the findings of this research support the proposition that implementing the three proposed dimensions results in seamlessness, which positively influences customer satisfaction with the interaction. Previous literature has proposed that the OSIE is the way to satisfy customer needs (Piotrowicz and Cuthbertson, 2014). This is supported by the current research. Specifically, to address RQ2, this paper shows that the OSIE has a direct and positive impact on customer satisfaction with the omnichannel interaction. This means that the greater the perception that the omnichannel interaction is seamless by the customer, the higher their satisfaction with their experience with the firm. This finding empirically confirms the proposals that literature has suggested (Brynjolfsson, et al., 2013; Huré, et al., 2017; Picot-Coupey, et al., 2016; Rigby, 2011).

Finally, this study expands previous marketing literature in the digital context (San-Martín and Jiménez, 2011) by confirming a gender effect in the omnichannel domain. First, study 1 found that females perceive greater overall satisfaction with the omnichannel interaction than males. This finding is in line with research that has shown that females generally present higher levels of satisfaction in their shopping experiences than males (Atulkar and Kesari, 2017). In addition, the results of study 2 showed a similar difference

between male and female satisfaction, such that females reported significantly lower satisfaction than males when a non-seamless, versus seamless, scenario was presented.

Therefore, an inconsistent and interrupted omnichannel interaction will more negatively affect women's satisfaction than men's. This is consistent with marketing literature that has suggested that females react more strongly than males to some environments with which they are not comfortable (Luo, McGoldrick, Beatty, & Keeling, 2006; San-Martín, López-Catalán, & Ramon-Jeronimo, 2012).

Theoretical implications

This paper makes three contributions to omnichannel literature. Despite the interest that literature has given to seamlessness (e.g. Piotrowicz and Cuthbertson, 2014; Shen, et al., 2018), the concept, its dimensionality, and its influence on omni-consumer behavior need more attention. There is a lack of extant research that explains the underlying dimensions of the OSIE in a comprehensive way. Thus, the first contribution of this research is to fill this knowledge gap, by proposing that the OSIE is a multidimensional construct. The empirical results of this research indicate the multidimensionality of this construct and confirm that consistency, freedom in channel selection, and synchronization across channels provide the foundation for a seamless interaction experience. As a result, this study offers an original framework for understanding the OSIE, contributing, in this way, to current and future research. The findings of this research provide an instrument that informs scholars and practitioners how to compose a seamless interaction experience, one of the most emphasized variables in the omnichannel context.

Moreover, this research can be used as the basis for building further research. The multidimensional OSIE framework confirmed in this paper was tested using brick and mortar stores, online, and mobile channels. However, it also provides insight in terms of managing the ever-changing retail environment through its applicability across all channels. Changes in

technology and consumer behavior continuously challenge firms to stay up-to-date. However, the current framework provides insight into omnichannel management by highlighting the importance of consistency, freedom in channel selection, and synchronization across all channels, both existing and new, as they continue to evolve. The current research acknowledges the evolution of channels and is one of the first to explore social media in the omnichannel domain. As research continues to explore new channel innovations, such as the advent of voice technology in the mobile channel (Pagani, Racat, & Hofacker, 2019) or augmented reality in the online channel (Fan, Chai, Deng, & Dong, 2020), the current research provides a theoretical and managerial framework that can be applied to integrate all channels into a seamless experience. As a result, this framework does not limit the seamless interaction experience to the current channels, but it is openly described to be adapted to the evolving context. Acknowledging the fast evolution of this context, the way the dimensions are described enables future research to adapt the scales and scenarios including the new channels and touchpoints appeared.

The second contribution of this work is to advance omnichannel research by examining the subsequent impact that perceived seamlessness between touchpoints has on the customer-brand interaction. Specifically, the crucial role of a seamless interaction experience on satisfaction with the omnichannel interaction is empirically tested. Thus, this paper moves this strain of literature forward by confirming that when customers perceive the omnichannel management as seamless, their satisfaction with the omnichannel interaction is enhanced directly and positively.

Although it was not proposed, the third contribution of this paper is the identification of differences that exist between men and women's satisfaction with omnichannel interactions. Specifically, women in this study exhibited significantly lower satisfaction than men when faced with a non-seamless interaction experience. This can orient the research in the

omnichannel field to explore additional nuances of the OSIE. Although gender has been studied deeply, research has generally focused on examining its effect in positive situations (e.g. Atulkar and Kesari, 2017). This research shows different gender effects, specifically in interaction experiences that are not seamless, and opens new questions about its role in the omnichannel context. As a result, the importance of focusing not only on the reactions in ideal scenarios, but also in possible uncomfortable or unpleasant scenarios, is evidenced in this paper. This confirms the importance of continuing to study gender differences in consumer behavior, as Atulkar and Kesari (2017) state.

Fourth, this study presents robust results that are replicated using two methods, a survey of real omni-consumers and a controlled experiment, which allows for a conservative test of the proposed research questions. In study 1, participants reflected on their own past experiences as omni-consumers and evaluated the seamlessness of their interaction experience. In study 2, a controlled experimental setting was used to create an omnichannel environment that was either seamless or non-seamless. In both studies, results robustly support the proposed dimensions of the OSIE and their relative importance, and the relationship between the OSIE and higher customer satisfaction with their omnichannel interaction.

Managerial implications

Omnichannel behavior has become a burning topic in marketing today. As a result, academic researchers have emphasized that practitioners need to manage multiple channels in a seamless way. However, a recent report edited by the Boston Consulting Group (BCG) shows a surprising reality. 83% of the companies could not make connections across consumer touchpoints, and 80% suffered from inadequate channel coordination (Field, Patel, & Leon, 2019). As guidelines to achieve this crucial aspect of retail strategy have not previously been specified, this research offers several important contributions for practitioners regarding the

omnichannel environment. First, the results inform omnichannel managers about how to design channels to offer the fundamental seamless interaction experience to their customers. Concretely, the findings of this research show that consistency is the most important dimension to create an OSIE, followed by synchronization and, finally, freedom in channel selection. Thus, managers may critically analyze their strategy and modify it to present a unified representation of the company across all the channels (e.g. same aesthetics and brand image, same prices and assortment or consistent promotions across the channels). Then, channels should be synchronized and the mentality of “what you start online (offline) has to finish online (offline)” must disappear. Instead, to achieve synchronization across channels, managers should adopt the philosophy that ‘channels have no barriers’. Firms should integrate the management of channels to offer flexible purchase and return policies that allow consumers to bridge multiple channels in a single purchase. Consequently, firms may allow consumers to proceed in each stage of the decision-making process wherever they want, interchanging and combining all the channels according to their needs without restrictions. Companies will avoid free-riding behavior (Flavián, Gurrea, & Orús, 2019), which is one of the most critical challenges that firms face.

Second, the results of this paper confirm the importance of developing an improved strategy for omnichannel management to increase customers’ satisfaction. Firms that utilize multiple retail channels should implement the dimensions of OSIE to create a seamless environment in order to increase customer satisfaction with the omnichannel interactions. To offer a seamless interaction experience and improve satisfaction firms should, for example, allow customers to buy a product online and then pick it up in the store, or provide the same information about products, prices, and sales promotions across all the channels. A uniform representation across channels should make the customer feel like they are interacting with a single unified brand across all touchpoints.

The results of this research also present insights for brands that specifically target a female market. It is especially important for such brands to manage omnichannel touchpoints seamlessly, because non-seamless interaction experiences more negatively impact female customers' satisfaction with their interaction experience, relative to males. Consequently, firms should be particularly conscious of the importance of OSIE and its impact on satisfaction for female consumers. For example, firms that specifically target female consumers might emphasize the seamlessness by including messages that accentuate the consistency, freedom, and synchronization across channels (e.g. *“buy the product online and pick it up in the store”* or *“for assistance you can ask us online or visit our store”*). Moreover, firms could use satisfaction surveys to ask customers about their interaction experiences to detect areas of potential improvement.

Limitations and further research

This study is subject to some limitations that can be addressed in further research. First, only the effect of the OSIE on customer satisfaction is tested. Future research can consider its impact on additional variables, such as brand preference (J. Zhang, et al., 2010), brand love (Palusuk, Koles, & Hasan, 2019) or word-of-mouth behaviors (Manser Payne, Peltier, & Barger, 2017). The impact of seamlessness in the omnichannel interaction experience can also be examined on consumer decision-related variables, for example, choice behavior, decision confidence, or decision comfort. Similarly, further analysis could extend the research by including some moderating and/or mediating effects (Cummins, et al., 2016; Verhoef, et al., 2015). As moderators, the individual differences among consumers, such as omnichannel tendency, channel preference, or channel use can be included. Satisfaction may work as mediator between the perceived OSIE and subsequent consumer behavior. The examination of downstream effects of customer satisfaction with the omnichannel interaction experience

would add a greater understanding of how the seamless transition between channels influences consumer behavior.

Second, although study 1 does not focus on one specific sector, study 2 focuses on a single product category. Because of the technical limitations and complexity of an online experiment, a black basic t-shirt was used as a standard product that presents unisex characteristics. To alleviate this limitation, future research should replicate the study in other categories.

Future research may also examine the effects of consistency, freedom in channel selection, and synchronization by varying different aspects of these three dimensions than were used in the present study. The experimental stimuli used in study 2 were created by varying elements of the shopping scenario that are assessed in the scales in the literature and used in this paper. Specifically, product availability, price, brand logo, and sales promotions were the elements of the shopping scenario that differed between seamless and non-seamless conditions. Future research may examine each of these variables separately to discern their individual effects on customer satisfaction with the omnichannel interaction. Moreover, future research may manipulate consistency using other aspects of the interaction experience, such as customer service, to examine the effects of on customer satisfaction.

Additionally, the present research is one of the first to incorporate social media as an important touchpoint in the omnichannel domain, and future studies may expand on this channel. As consumer behavior has evolved to incorporate social media as a means of interacting with brands, searching for information, and as a platform for both firm and consumer-generated marketing content, it is important for omnichannel research to begin to incorporate this channel (Cummins, et al., 2016; Sands, et al., 2016). Future research is needed to examine the ways in which it can be seamlessly incorporated into firms' portfolio of consumer touchpoints (e.g. wearables, digital assistants, voice...).

Finally, we identify the OSIE constructs from the overarching themes found in the literature. Considering that the retail environment constantly evolves and that satisfaction with the OSIE is based on each consumer's subjective perception of the seamlessness of their interaction experience, qualitative research may be a fruitful avenue for future work in this domain.

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APPENDICES

Appendix 1. OSIE underlying dimensions identified in literature review.

Author/s	Reflections about seamlessness	Underlying dimensions captured
Chatterjee (2010, p. 438)	“With more service outputs seamlessly available across several channels, customers can choose their preferred channel to interact with a retailer across multiple contact points at each stage of the purchase process during a single purchase.”	<ul style="list-style-type: none"> • Freedom in channel selection • Synchronization
J. Zhang, et al. (2010, p. 170)	“(…) to be able to buy a product through the retailer's Internet or catalog channels and pick it up or return it to a local store; find out if a product offered on the Internet channel is available at a local store; and, when unable to find a product in a store, determine if it is available for home delivery through the retailer's Internet or catalog channels.”	<ul style="list-style-type: none"> • Synchronization
Shankar, et al. (2011, p. S33)	<p>“As technology enables shoppers to increasingly use and engage with multiple channels of a retailer, they are also looking for consistent information and seamless experience across these channels.”</p> <p>“An innovative way to provide this seamless experience is to signal and promote the use of multiple channels by linking them.”</p> <p>“A seamless experience that allows shoppers to return products bought in one channel through another channel is also becoming common.”</p>	<ul style="list-style-type: none"> • Consistency • Freedom in channel selection • Synchronization
Kim, et al. (2014, p. 11)	“A fully implemented omni-channel strategy seamlessly offers integrated and interchangeable distribution platforms for searching, shopping, ordering, purchasing, pickup, delivery, and returns. To achieve this, all operational points in the entire value chain must be seamlessly integrated.”	<ul style="list-style-type: none"> • Synchronization
Lazaris and Vrechopoulos (2014, pp. 2, 3)	<p>“(…) the goal of multi-channel integration must be to provide a superior customer experience that is consistent and seamless across channels. (…) the same information in the same style and tone across the channels. (…)</p> <p>underlined the significance of seamless integration and consistent image management in multichannel environments.</p> <p>“(…) the importance of IT (internet connectivity, data warehousing and CRM) in providing “a seamless flow of synchronized information across channels.””</p>	<ul style="list-style-type: none"> • Consistency • Synchronization
Piotrowicz and Cuthbertson (2014, p. 8)	“Customers expect consistent, uniform, integrated service and experience, regardless of the channel they use; they are willing to move seamlessly between channels—traditional store, online, and mobile—depending on their preferences, their current situation, the time of day, or the product category.”	<ul style="list-style-type: none"> • Consistency • Freedom in channel selection • Synchronization

Verhoef, et al. (2015, pp. 175, 176)	<p>“Channels are interchangeably and seamlessly used during the search and purchase process and it is difficult or virtually impossible for firms to control this usage.”</p> <p>“Firms themselves can also provide these seamless experiences, for example, by having mobile devices (i.e., tablets) in the store, where customers can seek information about their products and order them (e.g., Apple Stores). Alternatively, through in-store Wi-Fi networks, firms can communicate with their customers through their mobile devices and also track their behavior.”</p> <p>“Thus, consumer switching across channels and devices such as a desktop, laptop and mobile devices are all part of the shoppers’ omni-channel experience and firms need to consider this to provide a seamless experience.”</p>	<ul style="list-style-type: none"> • Synchronization • Freedom in channel selection
Huang, et al. (2016, p. 275)	<p>“The retailer can also improve the connections between the two channels so that the consumers can seamlessly switch between the two to leverage the synergy effect. In other words, the retailer should enable a consumer to complete the shopping process through either channel with the same process, and to switch at any segment of the process.”</p>	<ul style="list-style-type: none"> • Synchronization
Juaneda-Ayensa, et al. (2016, pp. 3, 7)	<p>“They (channels) are thus used seamlessly and interchangeably during the search, purchase, and post-purchase process.”</p> <p>“All touchpoints must be integrated to provide a seamless and complete shopping experience, regardless of the channel used.”</p>	<ul style="list-style-type: none"> • Synchronization
Picot-Coupey, et al. (2016, p. 357)	<p>“Blurring channels and redesigning them into a unique, seamless channel is thus challenging as it requires a “seamless organization” in which the traditional organizational lines are blurred so that all departments work together to deliver a seamless and enriched brand experience. Interestingly, our findings show that the terms “to orchestrate,” “orchestration,” “to synchronize” and “synchronization” were frequently used by our interviewees.”</p>	<ul style="list-style-type: none"> • Synchronization
Huré, et al. (2017, pp. 314, 316)	<p>“Moving across multiple channels and touchpoints is becoming the norm for consumers who now expect to travel consistent and seamless shopping journeys among these channels and experience.”</p> <p>“Furthermore, an omni-channel shopping experience is considered to be seamless (i.e., without rupture or friction) if the consumer can move effortlessly from one touchpoint to another (Brynjolfsson et al., 2013; Cao, 2014; Fulgoni, 2014).”</p>	<ul style="list-style-type: none"> • Consistency • Freedom in channel selection • Synchronization • Synchronization
Mosquera, et al. (2017, p. 173)	<p>“If all channels are connected, customers can start their journey on one channel and complete it on another, resulting in a seamless experience.”</p>	<ul style="list-style-type: none"> • Synchronization

Saghiri, et al. (2017, pp. 53, 58)	<p>“Omnichannel retailing aims to address this issue (deliver a consistent and reliable consumer experience) by coordinating processes and technologies across all channels, to provide seamless, consistent and more reliable services.”</p> <p>“Ideally, by definition, in omni-channel systems customers should be able to switch seamlessly between the channels' stages, types and agents.”</p>	<ul style="list-style-type: none"> • Consistency • Synchronization
Mosquera, et al. (2018, pp. 65, 74)	<p>“If all channels are connected, customers can start their shopping journey in one channel and finish it in another, creating a seamless experience.”</p> <p>“The omnichannel strategy is centered on customers and their shopping experience and seeks to ensure seamless communication between the company and customer through the myriad channels and touchpoints throughout the shopping journey, allowing customers to interact with the brand through whatever channel they might choose at any given time.”</p>	<ul style="list-style-type: none"> • Synchronization • Freedom in channel selection • Synchronization
Shen, et al. (2018, pp. 63, 71)	<p>“Omnichannel involves not only the simultaneous use of multiple channels, but also the synergetic management of the parallel channels to make customers' cross-channel transition experience seamless and integrated.”</p> <p>“(…) this study defines omnichannel service as a kind of service that allows customers freely choose among all parallel channels, and seamlessly switch among the different channels, without any information loss or reiteration.”</p> <p>“Service providers should ensure that information provided in different channels is consistent, and service process across different channels is seamless.”</p>	<ul style="list-style-type: none"> • Consistency • Freedom in channel selection • Synchronization • Consistency • Freedom in channel selection • Synchronization • Consistency
Ieva and Ziliani (2018, p. 318)	<p>“Retailers are advised to pursue omnichannel strategies to ensure that all touchpoints are consistent, thematically coherent and connected to offer a seamless and unique customer experience, since this is what the majority of customers will experience.”</p>	<ul style="list-style-type: none"> • Consistency • Synchronization
M. Zhang, Ren, Wang, & He (2018, p. 182)	<p>“The objective is to create a seamless and complete shopping process for consumers (...). Consumers will then be able to shop in all of the available channels with a same account, and all of the information and services that are needed will be consistent across the channels.”</p>	<ul style="list-style-type: none"> • Consistency • Synchronization
Kang (2019, p. 1361)	<p>“Consumer switching across channels and devices including desktops, laptops, mobile devices and social media represents a variety of shoppers' seamless omnichannel experiences; consumers are able to generate full interaction.”</p>	<ul style="list-style-type: none"> • Freedom in channel selection
Haider, et al. (2020, p. 1)	<p>(...) offering consumers a seamless shopping experience and enabling them to switch channels almost effortlessly. It provides customers the freedom to shop anytime and anywhere, thereby eliminating barriers between channels</p>	<ul style="list-style-type: none"> • Freedom in channel selection • Synchronization

Appendix 2

Manipulation (2-cell between subjects)

“Imagine you are in a store shopping for a black t-shirt (or something that is relatively universal/gender neutral/most people would buy and wear). While you are in the store, you are using your mobile device to look at the brand’s website and social media pages for information.

Below is some of the information that you see on their website and social media page” (the following pictures are mockups of what was presented to participants):

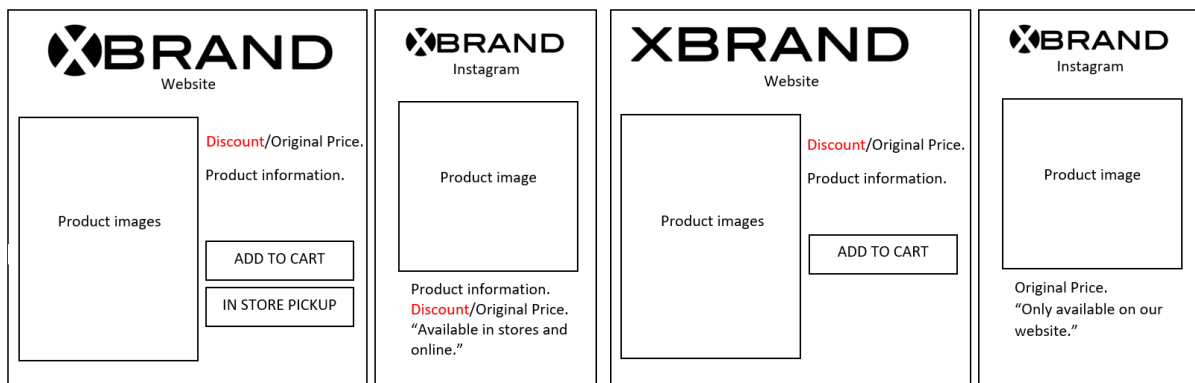


Figure A.1. Condition 1: seamless

Figure A.2. Condition 2: non-seamless

Scenarios (seamless condition in bold):

You ask the sales associate about the t-shirt and a 20% off sales promotion that is being advertised online. [**The associate tells you that they can honor the same sales promotion in-store**] [The associate tells you that they cannot honor the same sales promotion in-store].

After you’ve found enough information about the t-shirt that you want to purchase on the brand’s online platforms, you ask the sales associate to try on the t-shirt. The associate [**tells you that they do carry the t-shirt in the store, but that your size is out of stock**] OR [tells you that they **don’t** carry the t-shirt in the store, because the products are different from the website].

After that you ask the sales associate about the possibility of ordering online to pick up in the store and whether you can exchange or return the t-shirt in the store if you buy it online. [**The associate tells you that you can pick up and exchange or return the t-shirt in the store regardless of where you buy it**] [The associate tells you that you cannot pick up, or exchange or return the t-shirt in the store, because the sales channels are different].

You buy the t-shirt on their website and [**decide to pick up it in the store**] [wait for it to be delivered at home].

Appendix 3

Correlation matrix (first-order model)

	C1	C2	C3	C4	C5	F1	F2	F3	F4	S1	S2	S3	S4	S5	S6
C1	1.000														
C2	.346	1.000													
C3	.332	.518	1.000												
C4	.323	.316	.412	1.000											
C5	.253	.454	.419	.430	1.000										
F1	.315	.353	.325	.242	.389	1.000									
F2	.131	.273	.304	.199	.399	.331	1.000								
F3	.098	.154	.216	.223	.240	.197	.444	1.000							
F4	.171	.183	.286	.198	.306	.332	.338	.453	1.000						
S1	.149	.236	.241	.096	.314	.206	.344	.214	.314	1.000					
S2	.189	.282	.119	.089	.198	.180	.332	.189	.309	.388	1.000				
S3	.245	.144	.181	.177	.317	.296	.300	.220	.153	.359	.288	1.000			
S4	.214	.116	.103	.156	.144	.158	.400	.311	.130	.279	.269	.476	1.000		
S5	.083	.145	.210	.221	.405	.296	.357	.217	.399	.327	.353	.353	.356	1.000	
S6	.241	.379	.371	.338	.405	.465	.480	.427	.326	.296	.369	.333	.290	.370	1.000

Note: C: Consistency; F: Freedom in channel selection; S: Synchronization

Correlation matrix (second-order model)

	Consistency	Freedom in channel selection	Synchronization
Consistency	1.000		
Freedom in channel selection	.554	1.000	
Synchronization	.455	.671	1.000